

An Analysis of Healthcare Disparities Among Different Demographic Groups Using Social Construction of Technology

A Research Paper submitted to the Department of Engineering and Society

Presented to the Faculty of the School of Engineering and Applied Science
University of Virginia • Charlottesville, Virginia

In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science, School of Engineering

Ketki Morabkar

Spring 2022

On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

Advisor

S. Travis Elliott, Department of Engineering and Society

Introduction

Disparities in healthcare services remain pervasive throughout the world, including the United States, and it is critical to perform adequate research to understand how these problems have come about and make decisions that will rectify them. This is especially because inequalities in usage of these services remain a large determinant of differences in health outcomes across different demographic groups. Studies have consistently shown that health outcomes and access to healthcare services vary within demographic and socioeconomic factors such as race, age, and income with certain groups and minorities facing significant disadvantages (*Social Determinants of Health - Healthy People 2030* | *Health.Gov*, n.d.). A large number of physical causes have been attributed to these differences, such as cost and location from healthcare facilities, but not as much attention has been given to how perception of healthcare can perpetuate these disparities. Therefore, the goal of this paper is to highlight the major disparities in healthcare and health outcomes within these different demographic groups and then use the framework known as Social Construction of Technology (SCOT) to explain key factors that contribute to these disparities.

Specifically, the research question that will be addressed in this paper is “How can SCOT be used to explain how varying perceptions of healthcare among different demographic groups contribute to the disparities that exist within healthcare services?” The SCOT framework was chosen for this analysis because it specifically addresses the importance of understanding the social context that a technology or system is embedded in to fully understand how it is utilized. Therefore, it is ideal to help explain how the way that both healthcare professionals and patients interpret healthcare services can shape how these entities use them. It is important to note that

this analysis serves to provide a supplemental explanation, not an alternative one, to other physical factors that also maintain healthcare disparities.

Methods

The research completed to analyze this topic includes first a literature search on national statistics and observations regarding current disparities in healthcare and health outcomes in the United States. The information collected is organized along certain demographic groups, which include race, age, and income. Specifically, the data comes from research groups and organizations that sought to quantify healthcare and health outcome disparities within each of these demographic groups. The goal was to identify which groups suffered from unequal access to healthcare services. Next, another literature search was conducted to obtain data regarding perceptions of healthcare relating to each of these groups, both by people within these groups and healthcare professionals treating them. The data collected here was obtained by research organizations and scientists in the form of surveys that asked respondents about their experiences treating or being treated in healthcare facilities. Then, the SCOT framework was used to analyze these two sets of data by drawing connections and establishing patterns.

Analysis of Healthcare Disparities

As stated in the Introduction, this topic is being analyzed as there are widespread health inequalities in the United States. Disparities in health outcomes are measured by comparing differences in the effects of various diseases between the population groups being compared, including incidence of a disease, prevalence, mortality, and morbidity (National Academies of Sciences et al., 2017). Disparities in access to healthcare are often measured by comparing quantities like health insurance coverage, usage of healthcare services, and type and amount of

treatment provided between population groups. It has been found that, often, these inequalities strongly target people of color and other marginalized groups (Taylor, 2019).

Studies have shown significant gaps in healthcare and health outcomes between members of different races. As stated above, these gaps consistently have shown to put people of color and Hispanic people at a disadvantage compared to non-Hispanic white people. One of these racial groups that experience consistently poorer health outcomes are African Americans. For example, regarding insurance coverage, it has been found that 10.6% of African Americans are uninsured compared to 5.6% non-Hispanic white people, based on data collected by the Center for American Progress in 2017. Therefore, it follows that African Americans face stronger barriers in access to healthcare services due to a lack of insurance. Additionally, regarding health outcomes, minority groups including African Americans again find themselves significantly more burdened by chronic diseases and conditions. For instance, African Americans experience the highest mortality rate from all cancers compared to other racial groups and show double the infant mortality rate when compared to the national average. They are also more likely to suffer from many common conditions such as asthma and hypertension, compared to non-Hispanic whites (“Health Disparities by Race and Ethnicity,” n.d.)

There have also been studies that show that people of older age face disadvantages in healthcare and health outcomes as well. This is especially important to consider as with increased age, there comes a greater risk of developing certain conditions and there is a greater need for healthcare. Older people face more cost barriers in access to healthcare due to factors such as working in lower-paying jobs, living off family support or assets, and receiving limited income from pensions. Additionally, older people have more limited mobility compared to the younger population, since they have a lower physical ability to travel to a healthcare facility and

because of poor transportation infrastructure in rural areas particularly. Furthermore, older people experience a greater amount of discrimination due to age. Even without all of these difficulties, older people are at much higher risk of developing a variety of health conditions such as hearing loss, osteoarthritis, chronic obstructive pulmonary disease, diabetes, depression, and dementia (*Ageing and Health*, n.d.).

Another important demographic factor in which there are gaps in healthcare and health outcomes is income status. There are strong negative correlations between income versus both mortality and morbidity, putting low-income groups at higher risk of negative health outcomes. Interestingly, these poor health outcomes that result from lower income in turn contribute to a reduced income, creating a feedback loop known as the “health-poverty trap” (*Health, Income, & Poverty*, n.d.). Additionally, lower income makes it difficult for individuals, especially those who are uninsured, to access the necessary care and treatment that they need. As income inequality continues to grow, it is becoming more critical to study the underlying causes and make policy decisions that will lower the income gap and improve health outcomes.

Race, age, and income are the three main demographic groups being analyzed in paper using the SCOT method to determine how perceptions of healthcare within each affect the observed disparities. However, there are many additional demographic factors, such as gender and sexual orientation, in which marginalized groups face clear disparities in healthcare and health outcomes. Therefore, further research can apply the SCOT analysis to these other demographic groups to understand social and cultural barriers that affect the usage of healthcare services so that decisions can be made to alleviate those burdens.

Social Construction of Technology

As previously stated, there have been extensive studies completed over the years to quantify health disparities and trends in these disparities. There exist many studies, although to a lesser extent, on causes underlying these disparities. However, many of these causes are physical factors that are relatively easy to observe and measure, such as cost barriers, location from healthcare facilities, and environmental factors. There needs to be greater research on how cultural and social factors and varying perspectives on the current healthcare system affect how different individuals utilize it. This is more difficult to measure and analyze, as it requires making connections between more subjective experiences and observable disparities. Therefore, this paper presents the STS framework, Social Construction of Technology, as an appropriate framework to analyze the relationship between differences in perception of healthcare and healthcare disparities.

Essentially, the SCOT framework advocates the idea that technology is shaped by human action. This contrasts the idea posited by technological determinism, which is that technology itself shapes and determines human action. An important argument of SCOT (that is also key in the analysis within this paper) is that to fully understand how a technology is used, it is also crucial to consider the social environment that it is placed in. In other words, regarding the topic of this paper, how a technology or system such as the healthcare system is used depends on the social and cultural understandings of the individuals and groups accessing and using it. In the case of the healthcare system in the US, there are multiple demographic groups that need to use healthcare services for treatment or preventative care but may do so differently based on their perceptions or values regarding the system, which in turn may contribute to the disparities that are observed (*SCOT | STS Infrastructures*, n.d.).

The SCOT theory was introduced by Wiebe Bijker and Trevor Pinch. In their paper, “The Social Construction of Facts and Artefacts or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other”, they presented arguments supporting this theory and outlined the concepts that form the framework. According to these founders, the SCOT method can be divided into two main stages: interpretative flexibility and closure (“Social Construction of Technology,” 2022).

In the first stage, interpretative flexibility, the technology, or system in this case, that is being studied is analyzed in terms of the various interpretations that different groups form regarding that system, problems that arise because of these interpretations, and how these interpretations related to the design or usage of the system. Within this stage, it is important to identify the relevant social groups involved with the system, including both users and the producers. Relating to the topic of this paper, the users belong to various demographic groups and the producers include, but are not limited to, healthcare professionals treating them. As stated before, this stage also considers problems and conflicts that arise by different interpretations that these relevant social groups have regarding the system (“Social Construction of Technology,” 2022). The problems that this paper focuses on in particular are healthcare disparities.

The second stage of the SCOT method, closure, studies how the interpretative and design flexibilities of the system achieve closure and resolve the problems outlined in the first stage. Closure can be reached through different means, two examples of which are rhetorical closure and redefinition of the problem. During rhetorical closure, new designs of the system are no longer needed if the relevant social groups consider the problem solved. On the other hand, during redefinition of the problem, the system being studied may still give rise to certain

problems and conflicts, but if it resolves a different or more important problem, it will still achieve closure.

As stated earlier, this paper will apply the SCOT method described above in the context of the healthcare system in the United States to explain how different perceptions or interpretations of this system by the relevant social groups (in this paper, these include race, age, and income) maintain the healthcare disparities that exist within the system today. This paper will use data to additionally explain how the healthcare system has achieved closure despite the persistence of disparities.

Research

To analyze the research question, survey data obtained from each of three demographic groups (race, age, and income status) was incorporated within the SCOT framework and used to draw connections with the disparities that the corresponding group currently faces within the healthcare system. More specifically, in accordance with the SCOT method, the relevant social groups will be identified for each scenario and the survey data will then be used to determine the interpretations of the healthcare system by those social groups. These interpretations will be used to explain the resulting problems, specifically disparities, that arise. Finally, the survey data will also be used to explain how closure was achieved in the healthcare system despite these disparities.

African Americans

The first relevant social group whose perceptions will be analyzed are African Americans. Studies show that African Americans spend significantly less on healthcare than white people, indicating that there is disparity in usage that must be analyzed (Dieleman et al.,

2021). Multiple surveys indicate that African Americans, among other people of color, consistently report a lower quality of experience with the healthcare system. A survey completed by Kelley Hunt et al. found that African Americans show lower levels of trust and satisfaction with their physicians compared to white individuals. These results were obtained by asking survey respondents to rate how well they agree with statements such as “I trust my doctor to put my medical needs above all other considerations when treating my medical problems” to measure trust and rate statements such as “The thoroughness and carefulness of the examination and treatment you received” to measure satisfaction (Hunt et al., 2005).

Additional data helps to reveal some factors that contribute to these lower levels of trust and satisfaction. For example, by comparing individual hospital performance and the composition of the patients treated within that hospital, Amitabh Chandra et al. found that minority groups including African Americans were more likely to be treated by lower-quality providers (Chandra et al., 2017). Furthermore, regarding the perceived quality of treatment received, a cross-sectional study by Kressin and Lin found that African Americans are more likely to report “personal experience with overuse” when receiving tests or treatment at a healthcare facility (such as receiving tests/treatments that they felt were not necessary) and “cost-related overuse” (such as being prescribed an unnecessarily expensive treatment). Interestingly, African Americans were also more likely to report personal experiences with underuse and cost-related underuse (Kressin & Lin, 2015).

Age

The second relevant social group whose perceptions regarding the healthcare system are analyzed are older people. While older people require a greater amount of healthcare and are at greater risk of negative health outcomes than the younger population, they are also more likely to

develop negative perceptions about healthcare that decrease their likelihood of seeking care. A study performed by Jennifer Sun and Jacqui Smith found that negative self-perceptions of aging were associated with a greater chance of delaying health care and a greater perception of barriers to adequate care. In other words, this study found that the respondents believed that as they aged, their inclination to seek health care decreased due to perceptions of lower access to healthcare services, disliking going to the doctor, and being too busy to seek care (Sun & Smith, 2017).

Another relevant social group that needs to be considered within this section to help explain why older people experience a lower quality of care are medical professionals who treat them. Biases in treating patients detract from the quality of treatment they receive. Older people are less likely to receive necessary care due to a phenomenon known as “care-rationing”, where medical professionals will not prioritize treatment for them as a result of believing that older people will not respond as well to treatment as younger people. This indicates that medical professionals treat healthcare for older people as a less important need compared to the younger population (*Health Inequalities in Old Age | United Nations For Ageing*, n.d.). Additionally, studies show that medical professionals often have inadequate knowledge in treating older people, possibly due to a lack of enough exposure to older patients (Muhsin et al., 2020).

Additionally, even older people are more likely to perceive healthcare as a secondary need due to some of physical constraints they face. According to a 2010 survey, 63% of older people found it difficult to access healthcare, partly because many of them worked lower-paying jobs or lived off of family or other support. Therefore, many of them will avoid preventative care or even more emergent treatment to prioritize other costs (*Health Inequalities in Old Age | United Nations For Ageing*, n.d.).

Income

Although low-income presents itself as a physical barrier to accessing healthcare services, especially for those who are uninsured, survey data also indicates that those in lower-income groups maintain certain perceptions regarding the healthcare system that may affect how they choose to use the system. For example, a survey completed by Joachim Hero et al. showed that low-income groups were more likely to forgo needed medical treatment because they could not afford it. Additionally, it was also found that low-income respondents were less confident than high-income respondents that they would get adequate treatment, even when this data was adjusted for insurance status. Interestingly, this study also showed that Americans were less likely to exhibit moral concern about income-based differences in the quality of healthcare that people have access to, compared to respondents in other countries. This lower amount of moral concern was correlated with less enthusiasm towards policy changes to reform the healthcare system and reduce inequities (Hero et al., 2017).

Discussion

As described above, SCOT argues that the way a technology is interpreted or perceived shapes how it is used by the relevant social groups, which may lead to problems or disparities. The data obtained from these three demographic groups has provided key insights into how the perception of healthcare services can contribute to the disparities in access and health outcomes that exist in the United States today. One common pattern observed is that poor experience with the healthcare system and thus low perceived value of healthcare services among these demographic groups may result in diminished use of those services, maintaining the gap in healthcare usage that persists today. In the case of race and age, it can be seen that low trust and satisfaction levels among other factors regarding experiences with the healthcare system may

lead to decreased usage of those services. For example, African Americans were shown to consistently report poorer quality of healthcare and have also been shown to spend less on healthcare compared to white people (Dieleman et al., 2021). People who feel that their healthcare needs are not being met adequately are less likely to place value on the available healthcare services. As the survey data has shown, these low satisfaction levels are due to a combination of many factors, including, but not limited to, race-based and age-based discrimination, inadequate knowledge of medical professionals on how to administer treatment, and both overuse and underuse of treatment.

Another factor illustrated by the survey data that leads people in the US to place decreased value on healthcare services is the lack of availability of resources. Although it is evident that a lack of resources such as money or transportation will physically hinder people from accessing healthcare services, the data obtained in this study has also shown that certain demographic groups will still consider both preventative and emergent treatments as a secondary need even when they are insured or have resources available to seek treatment. This phenomenon was especially visible in the analysis of perceptions of different age and income groups. Older people and lower-income groups were less likely to access treatments that were available to them even when insured. These groups are placed with greater financial constraints, causing them to perceive healthcare as a lower-priority resource compared to other costs they are faced with. Therefore, they are less likely to frequent those services and maintain the observed gap in healthcare usage. These differences in perception again at least partially explain why healthcare usage is lower among older and low-income patients. Even medical professionals, when faced with limited resources, consider healthcare as a lower-priority need for older people.

The final stage of the SCOT method is understanding how closure is achieved among the problems that relevant social groups face regarding the technology or system being studied. Despite the disparities that were outlined in this paper in addition to those that exist among other demographic groups that were not discussed (such as gender and sexual orientation), the data that was analyzed in this paper additionally gave some insight as to how the healthcare system achieved rhetorical closure, especially regarding disparities in treatment by income. As stated before, rhetorical closure is achieved when the relevant social groups no longer consider there to be any problems surrounding a particular technology. In the “Income” section, it was found that Americans exhibited less moral concern about income-related healthcare disparities compared to other countries. This relatively lower concern helps to explain why Americans are overall more accepting of the state of the current healthcare system, as opposed to demanding further change.

Conclusion

The goal of this paper was to understand how differences in perception of healthcare within different demographic groups affect how they utilize the healthcare system, using the SCOT framework. Through the survey data collected, it was found that all of the three groups studied (older people, African Americans, and low-income groups) seemed to place a lower value on the healthcare system due to many factors such as physical constraints and lower perceived quality of care. This lower value in turn helps to maintain a lower usage of healthcare services and therefore perpetuate disparities in the system. While this paper offers some insight on how perceptions of healthcare affect healthcare usage, it is important to note some limitations of this study. First, the associations that were described in the paper between perception and healthcare usage were correlational and not necessarily causal. Additionally, this paper does not consider the effect of intersectionality, or the perceptions of people who belong to multiple

marginalized or minority groups. Future research therefore can consider how intersectionality affects perception and usage of healthcare. Additionally, further research can be done to understand the perceptions of other demographic groups, such as gender or sexual orientation.

References

- Ageing and health*. (n.d.). Retrieved March 20, 2022, from <https://www.who.int/news-room/factsheets/detail/ageing-and-health>
- Chandra, A., Frakes, M., & Malani, A. (2017). Challenges to Reducing Discrimination and Health Inequity Through Existing Civil Rights Laws. *Health Affairs (Project Hope)*, 36(6), 1041–1047. <https://doi.org/10.1377/hlthaff.2016.1091>
- Dieleman, J. L., Chen, C., Crosby, S. W., Liu, A., McCracken, D., Pollock, I. A., Sahu, M., Tsakalos, G., Dwyer-Lindgren, L., Haakenstad, A., Mokdad, A. H., Roth, G. A., Scott, K. W., & Murray, C. J. L. (2021). US Health Care Spending by Race and Ethnicity, 2002–2016. *JAMA*, 326(7), 649–659. <https://doi.org/10.1001/jama.2021.9937>
- Health Disparities by Race and Ethnicity. (n.d.). *Center for American Progress*. Retrieved March 20, 2022, from <https://www.americanprogress.org/article/health-disparities-race-ethnicity/>
- Health, Income, & Poverty: Where We Are & What Could Help | Health Affairs Brief*. (n.d.). Retrieved March 20, 2022, from <https://www.healthaffairs.org/doi/10.1377/hpb20180817.901935/full/>
- Health Inequalities in Old Age | United Nations For Ageing*. (n.d.). Retrieved March 20, 2022, from <https://www.un.org/development/desa/ageing/news/2018/04/health-inequalities-in-old-age/>
- Hero, J. O., Zaslavsky, A. M., & Blendon, R. J. (2017). The United States Leads Other Nations In Differences By Income In Perceptions Of Health And Health Care. *Health Affairs*, 36(6), 1032–1040. <https://doi.org/10.1377/hlthaff.2017.0006>

- Hunt, K. A., Gaba, A., & Lavizzo-Mourey, R. (2005). Racial and Ethnic Disparities and Perceptions of Health Care: Does Health Plan Type Matter? *Health Services Research, 40*(2), 551–576. <https://doi.org/10.1111/j.1475-6773.2005.00372.x>
- Kressin, N. R., & Lin, M.-Y. (2015). Race/ethnicity, and Americans' perceptions and experiences of over- and under-use of care: A cross-sectional study. *BMC Health Services Research, 15*(1), 443. <https://doi.org/10.1186/s12913-015-1106-7>
- Muhsin, A. A., Munyogwa, M. J., Kibusi, S. M., & Seif, S. A. (2020). Poor level of knowledge on elderly care despite positive attitude among nursing students in Zanzibar Island: Findings from a cross-sectional study. *BMC Nursing, 19*(1), 96. <https://doi.org/10.1186/s12912-020-00488-w>
- National Academies of Sciences, E., Division, H. and M., Practice, B. on P. H. and P. H., States, C. on C.-B. S. to P. H. E. in the U., Baciu, A., Negussie, Y., Geller, A., & Weinstein, J. N. (2017). The State of Health Disparities in the United States. In *Communities in Action: Pathways to Health Equity*. National Academies Press (US). <https://www.ncbi.nlm.nih.gov/books/NBK425844/>
- SCOT | STS Infrastructures. (n.d.). Retrieved March 20, 2022, from <https://stsinfrastructures.org/content/scot>
- Social construction of technology. (2022). In *Wikipedia*. https://en.wikipedia.org/w/index.php?title=Social_construction_of_technology&oldid=1076233699
- Social Determinants of Health—Healthy People 2030* | *health.gov*. (n.d.). Retrieved March 20, 2022, from <https://health.gov/healthypeople/objectives-and-data/social-determinants-health>

Sun, J. K., & Smith, J. (2017). Self-Perceptions of Aging and Perceived Barriers to Care: Reasons for Health Care Delay. *The Gerontologist*, 57(Suppl 2), S216–S226.

<https://doi.org/10.1093/geront/gnx014>

Taylor, J. (2019, December 19). *Racism, Inequality, and Health Care for African Americans*.

The Century Foundation. <https://tcf.org/content/report/racism-inequality-health-care-african-americans/>